Chapter 6 Appendix 6-A: Potential Mitigation Measures and Best Management Practices

Guidance was provided by the federal regulatory agencies to the project proponents as part of the regulatory processes. The guidance included Best Management Practices (often called BMPs) that are commonly required through the federal regulatory processes. Trustees will utilize appropriate BMPs to avoid or minimize impacts to natural resources, including listed species and their habitats.

The general regulatory process includes developing a project proposal, incorporating project specific measures as applicable and then entering into consultation or coordination under the relevant regulatory process (e.g., ESA, EFH, MBTA, MMPA, BGEPA, CWA). During this process, additional project-specific measures may be recommended or required. Not all measures are applicable to all projects and the same type of project implemented in different locations (e.g., dune walkovers in Florida and Texas) may not require the same BMPs due to differences in relevant conditions, such as species presence or absence or other factors.

Below is a list of BMPs that the Trustees have determined could be applicable to early restoration project types. The potential programmatic environmental consequences described in Chapter 6 are presented largely without factoring in the types of specific project actions and requirements (BMPs) that could avoid or minimize the potential adverse effects at a project-specific level in planning and implementation. An exception is the analysis of impacts to protected biological resources and their habitats. For these resources, project types were specifically analyzed with the incorporation of BMPs that would be typically required by trust resource agencies, as these projects would generally not be able to move forward through agency review without incorporation of BMPs. Standard restoration approaches and practices would be considered as individual projects are proposed. These include but are not limited to steps taken through site selection, engineering and design, use of proven restoration techniques and best management practices, and other conditions or activities required for project-specific regulatory compliance. The project-specific BMPs that are discussed in further detail in the project-specific environmental reviews may include, but not be limited to the BMPs provided here.

The list of BMPs is organized by resource and includes a section on general construction measures. Several of the BMPs are described in larger documents and only the titles are included here. As regulatory agencies periodically update their guidance documents, future restoration proponents and practitioners are expected to be familiar with such updated guidance and BMPs and apply as required or as agreed to by the Trustees. Appropriate websites should be checked during project planning to see if updated guidance is available.

Applicable BMPs for the specific projects proposed in Chapters 8-12 are discussed in further detail in the project-specific environmental reviews in those respective chapters. Future projects tiered from this programmatic document will include the BMPs below or BMPs identified during project consultation, as appropriate. If changes to the BMPs below are warranted for specific future projects, those changes would be analyzed in the future NRDA analysis and associated tiered EA/EIS. Once BMPs have been accepted, the project will be implemented using those BMPs.

The general organization of this list of BMPs is as follows:

Birds
- Bald Eagle
- Migratory Birds
- Piping Plover and Red Knot
- Red-cockaded woodpecker

Mammals
- Beach Mice
- Manatee
- Bottlenose Dolphin
- Marine Mammals

Reptiles
- Reticulated flatwoods salamander
- Eastern Indigo Snake

Tortoises/Turtles
- Gopher tortoise
- Sea turtles – in water
- Sea turtles – nesting beaches

Fish
- Gulf sturgeon

Plants
- Protected Plants

Invasive Species

General Construction Measures

Birds

Bald Eagles

If bald eagle breeding or nesting behaviors are observed or a nest is discovered or known, have all activities avoid the nest by a minimum of 660 feet. If the nest is protected by a vegetated buffer where there is *no* line of sight to the nest, then the minimum avoidance distance is 330 feet. Maintain this avoidance distance from the onset of breeding/courtship behaviors until any eggs have hatched and eaglets have fledged (approximately 6 months).

If a similar activity (like driving on a roadway) is closer than 660 feet to a nest, maintain a distance buffer as close to the nest as the existing tolerated activity. If a vegetated buffer is present and there is no line of sight to the nest and a similar activity is closer than 330 feet to a nest, then maintain a distance buffer as close to the nest as the existing tolerated activity.

In some instances activities conducted within 660 feet of a nest may result in disturbance, particularly for the eagles occupying the Mississippi barrier islands. If an activity appears to cause initial disturbance, stop the activity and move all individuals and equipment away until the eagles are no longer displaying disturbance behaviors. Contact the Service's Migratory Bird Permit Office to determine how to avoid impacts or if a permit may be needed.

Migratory Birds

Use care to avoid birds when operating machinery or vehicles near birds.

During the project design phase, coordinate with the U.S. Fish and Wildlife Service and the State trust resource agency to site and design projects to avoid or minimize impacts to migratory bird nesting habitats or important feeding/loafing areas.

Avoid working in migratory bird nesting habitats during breeding, nesting, and fledging (approximately Mid February to late August). If project activities must occur during this timeframe and breeding, nesting, or fledging birds are present, contact the State trust resource agency to obtain the most recent guidance to protect nesting birds or rookeries and their recommendations will be implemented.

Conservation areas may already be marked to protect bird nesting areas. Stay out of existing marked areas.

If vegetation clearing is necessary, clear vegetation outside of migratory bird nesting season (approximately Mid February to late August) or have a qualified biologist inspect for active nests. If no active nests are found, vegetation may be removed. If active nests are found, vegetation can be removed after the nest successfully fledges.

Avoid driving over the wrack line or areas of dense seaweed, as these habitats may contain hatchlings and chicks that are difficult to see.

Install pointy, white, piling caps on exposed pilings to prevent bird roosting on piers, docks, and marinas.

Piping Plover and Red Knot

Provide all individuals working on a project with information in support of general awareness of piping plover or red knot presence and means to avoid birds and their critical or otherwise important habitats.

Avoid working in designated critical habitat when piping plover are present (approximately late July through mid-May) or important wintering sites for red knots when they are present(contact U.S. Fish and Wildlife Service for red knot time frames and habitats) to the maximum extent practicable. If work must be conducted when individuals are present, avoid working near concentrations of individuals or post avoidance areas to minimize disturbance.

For projects that result in large scale habitat changes, coordinate early with the U.S. Fish and Wildlife Service to enhance or protect habitat features preferred by the species (inlet shoals, lagoons, washover fans, ephemeral pools, baysides and mud flats). Do not remove sand from intertidal, sand, or mud flats.

Use dredged material to enhance adjacent emerged and submerged shoals and bayside habitats within and adjacent to project areas.

Minimize vegetation planting in preferred habitats and avoid removal of natural organic material ("wrack") year-around along the shoreline.

During recreational use, enforce leash or "no pet" policies in critical or important habitats.

Red-cockaded woodpecker
Avoid working within active red-cockaded woodpecker clusters (minimum convex polygon containing the aggregation of cavity trees used by a group of red-cockaded woodpeckers and a 200-foot wide buffer surrounding the polygon).

If avoidance is not possible or management activities in red-cockaded woodpecker suitable habitat are desired, conduct standard surveys to determine if the habitat is supporting any individuals or presence can be assumed. If red-cockaded woodpeckers are present (or assumed to be), avoid cavity trees and use mechanized equipment during the non-nesting season (approximately April 1 – July 31).

If tree removal is necessary, survey pine trees approximately 60 or more years old for active cavities within one year of the proposed removal. Extend surveys from the project site out to no less than ½ mile. Replace any cavities affected by the project via drilled cavity construction.

If impacts to suitable foraging habitat (pines approximately 30 or more years old and within ½ mile of an active cavity tree) are proposed, conduct a foraging habitat analysis. Foraging habitat may need to be replanted post-project.

Design projects within red-cockaded woodpecker suitable habitat such that prescribed fire needs are not impeded.

Mammals

Beach Mice
Avoid using vehicles and mechanical equipment within the dune system, including primary, secondary, and tertiary dunes.

Avoid storing or staging equipment, vehicles, and project debris in a manner or location where it could be colonized by mice.

If work must occur within the dune system, have a qualified, permitted, biologist survey the project site before work commences and flag potential burrows and tracks so that they can be avoided.

Where possible replace footpaths or low-lying dune walkovers with improved walkovers that do not fragment the dune system. For dune walkover construction in Florida and Alabama, *follow the Conservation Measures for Dune Walkover Construction* (USFWS 2013).

Avoid vegetation removal, including scrub vegetation. If vegetation is damaged or removed during project implementation, plant appropriate native plants in the same location to minimize erosion and provide a food source for beach mice. If forage plants are reduced or limited in the project area, supplemental beach mouse food sources may be necessary.

Manatee
In Florida, follow the most current version of the Standard Manatee Conditions for In-water Work available and the Additional Conditions for Project In-water Activities in Manatee Habitat (USFWS, 2011).

For in-water work in Alabama, Mississippi, and Texas where manatees could be present, follow conditions a, b, c, and d of the Standard Manatee Conditions for In-water Work. Report any collisions to the U.S. Fish and Wildlife Service or State trust resource agency. Temporary signs, if necessary, can be modified from the Florida Fish and Wildlife Conservation Commission's template to reflect local conditions. In Louisiana, follow the most recent version of the Standard Conditions for In-Water Work in the Presence of Manatees (USFWS n.d.a).

Bottlenose Dolphin
Follow the most current version of the Measures for Reducing Entrapment Risk to Protected Species, Revised: May 22, 2012

Marine Mammals
Follow the most current version of the Vessel Strike Avoidance Measures and Reporting for Mariners NOAA Fisheries Service, Southeast Region, Revised February 2008.

Reptiles

Reticulated flatwoods salamander
Avoid suitable habitat during all construction activities and do not permanently alter hydrology of the area. Avoid eliminating connectivity between suitable ponds.

Use silt fencing to prevent sedimentation or erosion of the project site into ponds.

If suitable habitat (including the approximately 1,500 buffer zone around breeding ponds) may be impacted, perform pre-project surveys within 2 miles of known breeding sites or assume the presence of reticulated flatwoods salamanders. Schedule work during the non-breeding season (summer) and maintain the natural contour of the ponds.

Eastern Indigo Snake
If suitable habitat or other evidence of Eastern indigo snake is discovered within the project area during site surveys, implement the most recent version of the U.S. Fish and Wildlife Service's *Standard Protection Measures for the Eastern Indigo Snake*.

Tortoises/Turtles

Gopher tortoise
If suitable habitat is present, have a qualified biologist conduct surveys to identify any gopher tortoise burrows. If burrows are within the project area and cannot be avoided through establishing a protective buffer (size determined by U.S. Fish and Wildlife Service and the State trust resource agency), implement standard procedures to relocate the tortoise within the project site but away from the areas of construction or restoration or consider conservation banks. A Candidate Conservation Agreement with Assurances may be appropriate for project sites within the non-listed range of the species.

Sea turtles – in water
Implement the following guidelines: Sea Turtle and Smalltooth Sawfish Construction Conditions, Revised: March 23, 2006 and Measures for Reducing Entrapment Risk to Protected Species, Revised: May 22, 2012 and Vessel Strike Avoidance Measures and Reporting for Mariners NOAA Fisheries Service, Southeast Region, Revised February 2008.

Sea turtles – nesting beaches
If a sea turtle (either adult or hatchling) is observed, maintain at least 200 feet between the turtle and personnel, equipment, or machinery and notify the sea turtle monitoring program. Allow the turtle to leave the area of its own volition.

During nourishment activities, use beach quality sand that is suitable for successful sea turtle nesting and hatchling emergence. Emulate the natural shoreline slope and dune system (including configuration and shape) to the maximum extent practicable.

In Florida and Alabama, avoid the use of vehicles and heavy machinery on nesting beaches during sea turtle nesting and hatching season (Approximately May through October).

- If work must occur on nesting beaches during sea turtle nesting season (May through August), begin work with vehicles or machinery after 9:00 am local time to allow the sea turtle monitoring program to detect and mark new nests and assess the need to relocate sea turtle nests that could be affected by the project construction. Avoid marked nests by at least 10 feet.
- If beach topography is altered, restore all areas to the natural beach profile by 8:00 pm local time each day during nesting and hatching season. Restore beach topography by raking tire ruts and filling pits or holes.
- Avoid driving over the wrack line or areas of dense seaweed, as these habitats may contain sea turtle hatchlings that are difficult to see.

All observed sea turtle nests located in Texas would be excavated and the eggs are relocated for incubation.

Construction in Texas should be scheduled to avoid Kemps nesting season, which extends from April 1 until October 1.

Fish

Gulf sturgeon
Avoid work in riverine critical habitats when Gulf sturgeon are likely to be present (April to October). Do not dredge in spawning areas when Gulf sturgeon are likely to be present.

During project implementation, maintain riparian buffers of at least 100 feet around critical habitat. Install silt fencing to prevent sedimentation or erosion into streams and rivers.

Operate dredge equipment in a manner to avoid risks to Gulf sturgeon (e.g., disengage pumps when the cutter head is not in the substrate; avoid pumping water from the bottom of the water column).

Implement the Sea Turtle and Smalltooth Construction Conditions, Revised: March 23, 2006 (NOAA, 2006) and Measures for Reducing Entrapment Risk to Protected Species, Revised: May 22, 2012 as they are protective of Gulf sturgeon as well.

Plants

Protected Plants

Perform surveys to determine if protected plants (or suitable habitat) are on or adjacent to the project site. Have a qualified individual perform the surveys and follow suitable survey protocols. Conduct plant surveys during appropriate survey periods (usually flowering season).

Design projects to avoid known locations and associated habitat to the extent possible. Use “temporary" removal of plants and soil profile plugs (which include the A and B horizons) with the intent to replace to original location post construction as a last resort. Consider transplanting and seed banking only after all other options are exhausted.

Enhance and protect plants on-site and adjacent habitats to the maximum extent possible.

Use only native plants for post project restoration efforts.

Invasive Species

Develop and implement a Hazard Analysis and Critical Control Points (HACCP) plan to prevent and control invasive species. Use (ASTM E2590 - 08) or other version of HACCP or other similar planning tool.

Implement an Integrated Pest Management (IPM) approach to facility design, sanitation, and maintenance to prevent and control invasive and pest species.

Inspect sites, staging, and buffer areas for common invasive species prior to the onset of work. Map any invasive species detected and note qualitative or quantitative measures regarding abundance. Implement a control plan, if necessary, to ensure these species do not increase in distribution or abundance at a site due to project implementation. Inspect sites periodically to identify and control new colonies/individuals of an invasive species not previously observed prior to construction.

Prior to bringing any equipment (including personal gear, machinery, vehicles or vessels) to the work site, inspect each item for mud or soil, seeds, and vegetation. If present, clean the equipment, vehicles, or personal gear until they are free from mud, soil, seeds, and vegetation. Inspect the equipment, vehicles, and personal gear each time they are being prepared to go to a site or prior to transferring between sites to avoid spreading exotic, nuisance species.

Place and maintain predator-proof waste receptacles in strategic locations during project implementation to prevent an increase in predator abundance. For projects designed to enhance or increase visitor use, maintain predator-proof waste receptacles for the life of the project.

Have the appropriate state agency inspect any equipment or construction materials for invasive species prior to use.

Inspect and certify propagated or transplanted vegetation as pest and disease free prior to planting in restoration project areas.

General Construction Measures

Guidelines:

Construction Guidelines in Florida for Minor Piling-Supported Structures Constructed in or over Submerged Aquatic Vegetation (SAV), Marsh or Mangrove Habitat. U.S. Army Corps of Engineers/National Marine Fisheries Service August 2001

Key for Construction Conditions for Docks or Other Minor Structures Constructed in or Over Johnson's Seagrass (Halophila johnsonii). National Marine Fisheries Service/U.S. Army Corps of Engineers October 2002

National Artificial Reef Plan (as Amended): Guidelines for siting, construction, development, and assessment of artificial reefs, Revised February 2007

Guidelines for Marine Artificial Reef Materials 1997 GSMFC Number 121

Bubble Curtain Specifications for Pile Driving

Assessment and Mitigation of Marine Explosives: Guidance for Protected Species in the Southeast U.S.

Piling Installation

Push pilings into soft, bottom substrate to reduce noise from installation; do not drive and hammer pilings into bottom substrate unless necessary for proper construction.

Protected species

Provide all individuals working on a project with information in support of general awareness of and means to avoid impacts to protected species and their habitats present at the specific project site.

Survey for other at-risk or imperilled species. If found on site, contact the U.S. Fish and Wildlife Service and State trust resource agency to determine if avoidance or minimization measures or a Candidate Conservation Agreement with Assurances may be appropriate.

Site maintenance and conduct

Use the nearest, existing staging, access and egress areas, travel corridors, pathways, and roadways (including those provided by the State, local governments, land managers, trustee, or private property owner, with proper permissions) and do not create new staging areas, access (except dunewalk overs) or egress, or travel corridors through dune habitats.

Limit driving on the beach for construction to the minimum necessary within the designated travel corridor–established just above or just below the primary "wrack" line. Avoid driving on the upper beach whenever possible, and never drive over any dunes or beach vegetation. Check with the U.S. Fish and Wildlife Service and State trust resource agency for additional specific beach driving recommendations in Florida and Alabama.

Minimize construction noise to the maximum extent practicable when working near protected species and their habitats.

Maintain or improve all lighting regimes. Methods include: working during daylight hours only, prohibiting lighting on dune walkovers, and using wildlife-friendly lighting where lighting is necessary for human safety.

Post signs at kiosks, ramps, and piers to provide visitors with information to avoid and minimize impacts to protected species and their habitats while recreating. Develop signs in coordination with National Marine Fisheries Service, U.S. Fish and Wildlife Service and the local State trust resource agency.

Supply and maintain containers for waste fishing gear to avoid fish and wildlife entanglement.

Land and vegetation protection

Develop and implement an erosion control plan to minimize erosion during and after construction and where possible: use vegetative buffers (100 feet or greater), revegetate with native species or annual grasses, and conduct work during dry seasons.

Develop and implement a spill prevention and response plan, including: conducting daily inspections of all construction and related equipment to assure there are no leaks of antifreeze, hydraulic fluid, or other substances and cleaning and sealing all equipment that would be used in the water to rid it of chemical residue. Develop a contract stipulation to disallow use of any leaking equipment or vehicles.

Prohibit use of hazardous materials, such as: lead paint, creosote, pentachlorophenol, and other wood preservatives during construction in, over, or adjacent to, sensitive sites during construction and routine maintenance.

Where landscaping is necessary or desired, use native plants from local sources. If non-native species must be used, ensure they are non-invasive and use them in container plantings.

Wetland and aquatic resource protection

Complete an engineering design and post-construction inspection for projects where geomorphic elevations would be restored in wetlands, marshes, and shallow water habitats to ensure the success of the restoration project. Manage elevation of fill material to ensure projected consolidation rates were accomplished and that habitat suitable for wetland and marsh vegetation is developed.

Perform an engineering design and post-construction inspection for projects where geomorphic elevations are restored within wetlands, marshes, and shallow water habitats to ensure the success of the restoration project.

Avoid and minimize, to the maximum extent practicable, placement of dredged or fill material in wetlands and other aquatic resources.

Design construction equipment corridors to avoid and minimize impacts to wetlands and other aquatic resources to the maximum extent practicable.

To the maximum extent possible, implement the placement of sediment to minimize impacts to existing vegetation or burrowing organisms.

Place protective warning signs and buoys around at-risk habitats for infrastructure projects that could increase recreational uses in SAV or oyster areas.

Apply herbicide in accordance with the direction and guidance provided on the appropriate Environmental Protection Agency (EPA) labels and State statutes during land-based activities.

Only use suitable borrow sites (that do not contain *Sargassum,* SAV, or oysters) as dredging sites for sediment. Obtain sediments by beneficially using dredged material from navigation channels or by accessing material from approved offshore borrow areas. Sediments must closely match the chemical and physical characteristics of sediment at the restoration site. Additionally, use target borrow areas within reasonable proximity to suitable sites for sediment placement.

When local conditions indicate the likely presence of contaminated soils and sediments, test soil samples for contaminant levels, and take precautions to avoid disturbance of -or to provide for proper disposal of - contaminated soils and sediments. Evaluate methods prior to dredging to reduce the potential for impacts from turbidity or tarballs.

Perform maintenance of generators, cranes, and any other stationary equipment operated within 150 feet of any natural or wetland area, as necessary, to prevent leaks and spills from entering the water.

Designate a vehicle staging area removed from any natural surface water resource or wetland to perform fueling, maintenance, and storage of construction vehicles and equipment. Inspect vehicles and equipment daily prior to leaving the storage area to ensure that no petroleum or oil products are leaking.

Upon completion of construction activities, restore all disturbed areas as necessary to allow habitat functions to return. Create and manage public access developments to enhance recreational experience and educational awareness to minimize effects to habitat within wetland and shallow water areas and to the long-term health of related biological communities.

Incorporate containment levees for fill cells for projects using marsh creation or other barrier island restoration. Remove these containment levees after construction to allow for the restoration of nature tidal exchange.

Use silt fencing where appropriate to reduce increased turbidity and siltation in the project vicinity. This would apply to both on land and in water work.

Continue oyster and clam shell recycling programs to provide natural material for creating additional oyster reefs.

Ensure shells to be introduced for reef creation are subjected to depuration in a secure open air area for a period of not less than 6 months.

Make all efforts to reduce the peak sound level and exposure levels of fish to reduce the potential impact of sound on fish present in the project areas.

Use a vibratory hammer whenever possible to reduce peak sound pressure levels in the aquatic environment.

Use sound attenuation devices where practicable for pulse-noise (impact hammers) to reduce peak sound pressure levels in the aquatic environment.

Stipulate the timing of activities to avoid impacts to spawning fish and eggs/larvae.

Use BMPs to reduce turbidity, such as turbidity blankets, to reduce the potential impact of turbidity on finfish.

Screen water withdrawal pipes to minimize potential entrainment of fish from the withdrawal area. Have project proponents coordinate with NMFS to create an intake screen that would minimize potential impingement of fish.

Aquaculture facilities

Treat effluent from aquaculture facilities to avoid dispersal of potential pathogens into receiving waters.

Make sure that all aquaculture facilities and fish raised in those facilities meet fish health standards and are screened for pathogens prior to release into receiving waters.

Implement a genetics management plan that ensures maintenance of genetic diversity of native stocks of finfish in the Gulf of Mexico.

Develop and implement a stocking management plan prior to the release of hatchery-reared finfish.

BMPs and Mitigation Measures – Benefits to Resources and the Human Environment

Potential BMPs and Mitigation Measures, including those described above as well as additional measures, have been organized into three tables to provide information on the potential benefits to natural resources and the human environment associated with implementing the measures:

1. Table 6A-1: *Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to Natural Resources.* This table presents the benefits to natural resources associated with implementation of a broad range of standard BMPs and Mitigation Measures;
2. Table 6A-2: *Potential Site-Specific and Construction Mitigation Measures and BMPs. Benefits to the Human Environment*: This table presents the benefits to the human environment associated with implementation of a broad range of standard BMPs and Mitigation Measures; and

3. Table 6A-3: *Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs.* This table presents BMPs and Mitigation Measures that may be implemented on –case-by-case basis when sensitive habitats or protected species may be present. These measures would not preclude implementation of BMPs or Mitigation Measures listed in Table 6A-1 or 6A-2, but may be implemented in addition to those deemed appropriate in Table 6A-1 or 6A-2 to further reduce potential for adverse effects to natural resources.

Table 6A-1. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to Natural Resources

Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources										
			Freshwater Environments		Saltwater Environment Fish Resources											Finfish						
	Upland Geology and Substrates	Nearshore Geology and Substrates	Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment	Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish	Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife
Tilling of compacted soil areas to reduce hardening.	X	X						X	X		X								X			X
Use of existing access ways whenever possible. Temporary access roads would not be built in locations that would suggest a likelihood of excessive erosion (e.g., large slopes, erosive soils, proximity to water body). All temporary access roads would be restored when the action is completed, the soil would be stabilized, and the site would be re-vegetated. Temporary roads in wet or flooded areas would be restored shortly after the work period was complete.	X	X		X	X		X	X	X	X	X		X	X		X	X	X	X	X	X	X
Selection and operation of heavy equipment to minimize adverse effects to the environment (e.g., minimally-sized, low-pressure tires, minimal hard turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils).	X	X		X	X		X	X	X	X	X					X	X	X	X	X	X	X
To the extent feasible, heavy equipment would work from the top of the bank, unless work from another location would result in less habitat disturbance.	X	X		X	X		X	X	X	X	X			X		X	X	X	X	X	X	X
Temporary stabilization of areas of upland soil disturbance by sediment and erosion control practices during construction, and re-vegetation with appropriate native species following construction.	X			X			X	X	X	X	X		X	X		X	X	X	X		X	X
When local conditions indicate the presence of contaminated soils/sediments is likely, soil samples would be tested for contaminant levels, and precautions would be taken to avoid disturbance of or provide for proper disposal of contaminated soils/sediments.	X	X	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Prior to dredging, methods will be evaluated to reduce the potential for impacts from turbidity.				X	X		X	X	X	X	X	X	X	X		X	X	X	X	X		
Seasonal rainfall will be factored into the construction timeline to reduce ground disturbance during raining or flood seasons.	X	X		X	X		X	X	X	X	X		X	X		X	X	X	X	X	X	X
Employment of standard BMPs for construction to reduce erosion, stormwater runoff, transport of soil into receiving waters, or disturbance of sediment.	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X
Employment of temporary erosion controls prior to any land clearing or land disturbance	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X

Table 6A-1. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to Natural Resources

Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources										
			Freshwater Environments		Saltwater Environment Fish Resources											Finfish						
	Upland Geology and Substrates	Nearshore Geology and Substrates	Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment	Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish	Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife
on the project site, which would be monitored during construction to ensure proper function. Turbidity curtains, hay bales, and erosion mats would be used where appropriate.																						
Confinement of vegetation removal and soil disturbance would be to the minimum area and the minimum length of time necessary to complete the action.	X	X	X	X	X	X	X	X	X	X	X			X		X	X	X	X	X	X	X
Site work stoppage under high flows or seasonal conditions that threaten to damage erosion and sediment control measures, except where efforts are aimed at avoiding or minimizing resource damage.	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X
Maintenance of generators, cranes, and any other stationary equipment operated within 150 feet of any natural or wetland area as necessary to prevent leaks and spills from entering the water.			X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Development and implementation of spill prevention and control plans to minimize the risk of releasing petroleum and oil products to receiving waters.			X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Management of hazardous material generated, used, or stored onsite in accordance with Federal and State regulations, including notification of proper authorities.	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Application of herbicide during land-based activities would be in accordance with the direction and guidance provided on the appropriate Environmental Protection Agency (EPA) labels.			X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X
Cleaning of construction equipment before moving between sites to prevent spread of invasive species							X	X	X	X	X	X		X					X	X	X	X
Identification of mooring locations for restoration-related barges and other boats to best avoid EFH and minimize damage to existing healthy reefs or adjacent SAV beds.							X	X	X	X	X		X	X		X	X	X	X	X		
Creation, as feasible, of a stockpile of topsoil; native channel material; and large, mature native trees and shrubs for reuse in the restoration process.	X	X						X	X		X								X		X	X
Upon completion of construction activities, all disturbed areas would be restored as	X	X	X	X	X		X	X	X	X	X	X		X		X	X	X	X	X	X	X

Table 6A-1. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to Natural Resources

Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources										
			Freshwater Environments		Saltwater Environment Fish Resources											Finfish						
	Upland Geology and Substrates	Nearshore Geology and Substrates	Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment	Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish	Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife
necessary to allow habitat functions to return.																						
Temporal (e.g., time-of-year, seasonal) restrictions for construction activities applicable to protection of Federally listed threatened and endangered species, EFH, diadromous fish species, SAV, or other natural resources could be employed to avoid impacts.							X	X	X	X	X		X			X	X	X	X	X	X	X
Fueling, maintenance, and storage of construction vehicles and equipment within a designated vehicle staging area removed from any natural surface water resource or wetland. Vehicles and equipment would be inspected daily prior to leaving the storage area to ensure that no petroleum or oil products are leaking.			X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Conducting preconstruction surveys for the presence of sensitive natural and cultural resources.							X	X	X	X	X				X	X	X	X	X	X	X	X
Installation of protective buffers around sensitive wetlands, surface waters, and wildlife habitat. At a minimum, flagging or fencing sensitive resource areas adjacent to the action area would be employed to avoid accidental impacts.				X	X		X	X	X	X	X			X		X	X	X	X	X	X	X
The use of an appropriate assemblage of species native to the action area or region, including trees, shrubs, and herbaceous species, would be used in the re-vegetation and restoration processes.							X	X	X	X	X					X	X	X	X	X	X	X
Performing exploratory trenching																						
During all phases of the project, keeping equipment and vehicles within the limits of the initially disturbed areas. In addition, use existing roads to the maximum extent feasible to avoid additional surface disturbance.							X			X						X	X	X				
Restoration activities could utilize the Secretary of the Interior's Standards for the Treatment of Historic Properties. Archeological deposits should be avoided or excavated, analyzed, and curated with the proper State or Federal repository.																						
Construction workers and volunteers employed in the projects associated with restoration techniques would be adequately trained to ensure that impacts are																						

Table 6A-1. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to Natural Resources

Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources									
			Freshwater Environments		Saltwater Environment Fish Resources											Finfish					
	Upland Geology and Substrates	Nearshore Geology and Substrates	Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment	Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish	Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife
minimized. Training may include but may not be limited to: understanding impacts to transportation and energy infrastructure.																						
Local companies should try to work with project leads to establish construction work times that overlap with off season tourism schedules.																						

Table 6A-2. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to the Human Environment.

Potential Mitigation Measures	Socio-economics		Cultural Resources	Infrastructure	Land and Marine Management	Tourism and Recreation Use						Fisheries		Marine Transportation	Aesthetics and Visual	Public Health and Safety	Noise	Air Quality and Greenhouse Gases
	Demographics	Regional Economy				Wildlife Observation	Hunting	Beach and Waterfront	Boating	Recreational Fishing and Stock Enhancement	Tourism	Commercial Fisheries, Processing, and Sales	Aquaculture, Processing, and Sales (and Shellfish Leases)					
Tilling of compacted soil areas to reduce hardening.																		
Use of existing access ways whenever possible. Temporary access roads would not be built in locations that would suggest a likelihood of excessive erosion (e.g., large slopes, erosive soils, proximity to water body). All temporary access roads would be restored when the action is completed, the soil would be stabilized, and the site would be re-vegetated. Temporary roads in wet or flooded areas would be restored shortly after the work period was complete.			X												X	X		X
Selection and operation of heavy equipment to minimize adverse effects to the environment (e.g., minimally-sized, low-pressure tires, minimal hard turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils).															X			X
To the extent feasible, heavy equipment would work from the top of the bank, unless work from another location would result in less habitat disturbance.						X	X	X										
Temporary stabilization of areas of upland soil disturbance by sediment and erosion control practices during construction, and re-vegetation with appropriate native species following construction.						X	X	X							X	X		X
When local conditions indicate the presence of contaminated soils/sediments is likely, soil samples would be tested for contaminant levels, and precautions would be taken to avoid disturbance of or provide for proper disposal of contaminated soils/sediments.	X															X		
Prior to dredging, methods will be evaluated to reduce the potential for impacts from turbidity.	X									X		X	X					
Seasonal rainfall will be factored into the construction timeline to reduce ground disturbance during raining or flood seasons.	X									X		X	X			X		

Table 6A-2. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to the Human Environment.

Potential Mitigation Measures	Socio-economics		Cultural Resources	Infrastructure	Land and Marine Management	Tourism and Recreation Use						Fisheries		Marine Transportation	Aesthetics and Visual	Public Health and Safety	Noise	Air Quality and Greenhouse Gases
	Demographics	Regional Economy				Wildlife Observation	Hunting	Beach and Waterfront	Boating	Recreational Fishing and Stock Enhancement	Tourism	Commercial Fisheries, Processing, and Sales	Aquaculture, Processing, and Sales (and Shellfish Leases)					
Employment of standard BMPs for construction to reduce erosion, stormwater runoff, transport of soil into receiving waters, or disturbance of sediment.	X		X			X	X	X		X		X	X		X	X		
Employment of temporary erosion controls prior to any land clearing or land disturbance on the project site, which would be monitored during construction to ensure proper function. Turbidity curtains, hay bales, and erosion mats would be used where appropriate.	X		X			X	X	X		X		X	X		X	X		
Confinement of vegetation removal and soil disturbance would be to the minimum area and the minimum length of time necessary to complete the action.			X	X		X	X	X							X	X		
Site work stoppage under high flows or seasonal conditions that threaten to damage erosion and sediment control measures, except where efforts are aimed at avoiding or minimizing resource damage.				X		X	X	X							X	X		
Maintenance of generators, cranes, and any other stationary equipment operated within 150 feet of any natural or wetland area as necessary to prevent leaks and spills from entering the water.						X	X	X				X	X		X	X		X
Development and implementation of spill prevention and control plans to minimize the risk of releasing petroleum and oil products to receiving waters.						X	X	X		X		X	X		X	X		
Management of hazardous material generated, used, or stored onsite in accordance with Federal and State regulations, including notification of proper authorities.																X		X
Application of herbicide during land-based activities would be in accordance with the direction and guidance provided on the appropriate Environmental Protection Agency (EPA) labels.																X		
Cleaning of construction equipment before moving between sites to prevent spread of invasive species						X	X	X							X			
Identification of mooring locations for restoration-related barges and other boats to best avoid EFH and minimize damage to existing healthy reefs or adjacent SAV beds.						X	X	X		X		X	X					
Creation, as feasible, of a stockpile of topsoil; native channel material; and large,																		

Table 6A-2. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to the Human Environment.

Potential Mitigation Measures	Socio-economics		Cultural Resources	Infrastructure	Land and Marine Management	Tourism and Recreation Use						Fisheries		Marine Transportation	Aesthetics and Visual	Public Health and Safety	Noise	Air Quality and Greenhouse Gases
	Demographics	Regional Economy				Wildlife Observation	Hunting	Beach and Waterfront	Boating	Recreational Fishing and Stock Enhancement	Tourism	Commercial Fisheries, Processing, and Sales	Aquaculture, Processing, and Sales (and Shellfish Leases)					
mature native trees and shrubs for reuse in the restoration process.																		
Upon completion of construction activities, all disturbed areas would be restored as necessary to allow habitat functions to return.						X	X	X							X	X		
Temporal (e.g., time-of-year, seasonal) restrictions for construction activities applicable to protection of Federally listed threatened and endangered species, EFH, diadromous fish species, SAV, or other natural resources could be employed to avoid impacts.						X	X	X		X		X	X					
Fueling, maintenance, and storage of construction vehicles and equipment within a designated vehicle staging area removed from any natural surface water resource or wetland. Vehicles and equipment would be inspected daily prior to leaving the storage area to ensure that no petroleum or oil products are leaking.																X		
Conducting preconstruction surveys for the presence of sensitive natural and cultural resources.			X			X									X			
Installation of protective buffers around sensitive wetlands, surface waters, and wildlife habitat. At a minimum, flagging or fencing sensitive resource areas adjacent to the action area would be employed to avoid accidental impacts.						X	X	X		X		X	X			X		
The use of an appropriate assemblage of species native to the action area or region, including trees, shrubs, and herbaceous species, would be used in the re-vegetation and restoration processes.						X	X								X			
Cultural resource monitoring of construction in the vicinity of the development			X													X	X	X
Conducting records searches to determine the presence of known archaeological sites and historic structures within the area of potential effect. Identify the need for an archaeological and/or architectural survey. Conduct a survey, if needed.			X	X														
During all phases of the project, keeping equipment and vehicles within the limits of the initially disturbed areas. In addition, use existing roads to the maximum extent feasible to avoid additional surface disturbance.			X			X	X	X							X	X		

Table 6A-2. Potential Site-Specific and Construction Mitigation Measures and BMPs: Benefits to the Human Environment.

Potential Mitigation Measures	Socio-economics		Cultural Resources	Infrastructure	Land and Marine Management	Tourism and Recreation Use						Fisheries		Marine Transportation	Aesthetics and Visual	Public Health and Safety	Noise	Air Quality and Greenhouse Gases
	Demographics	Regional Economy				Wildlife Observation	Hunting	Beach and Waterfront	Boating	Recreational Fishing and Stock Enhancement	Tourism	Commercial Fisheries, Processing, and Sales	Aquaculture, Processing, and Sales (and Shellfish Leases)					
Restoration activities could utilize the Secretary of the Interior's Standards for the Treatment of Historic Properties. Archeological deposits should be avoided or excavated, analyzed, and curated with the proper State or Federal repository.			X															
Construction workers and volunteers employed in the projects associated with restoration techniques would be adequately trained to ensure that impacts are minimized. Training may include but may not be limited to: understanding impacts to transportation and energy infrastructure.			X	X	X	X	X	X		X		X	X	X		X	X	X
Local companies should try to work with project leads to establish construction work times that overlap with off season tourism schedules.		X									X							
Local companies and workforces should be used for construction or implementation the project if possible to support local economic benefits.		X																
Vocational training for out-of-work fisheries workers.		X										X	X					

Table 6A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources										
				Freshwater Environments		Saltwater Environment Fish Resources											Finfish						
		Upland Geology and Substrates	Nearshore Geology and Substrates	Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment	Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish	Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife
BIRDS																							
Bald Eagle	If bald eagle breeding or nesting behaviors are observed or a nest is discovered or known, have all activities avoid the nest by a minimum of 660 feet. If the nest is protected by a vegetated buffer where there is *no* line of sight to the nest, then the minimum avoidance distance is 330 feet. Maintain this avoidance distance from the onset of breeding/courtship behaviors until any eggs have hatched and eaglets have fledged (approximately 6 months).																					X	
	If a similar activity (like driving on a roadway) is closer than 660 feet to a nest, maintain a distance buffer as close to the nest as the existing tolerated activity. If a vegetated buffer is present and there is no line of sight to the nest and a similar activity is closer than 330 feet to a nest, then maintain a distance buffer as close to the nest as the existing tolerated activity.																					X	
	In some instances activities conducted within 660 feet of a nest may result in disturbance, particularly for the eagles occupying the Mississippi barrier islands. If an activity appears to cause initial disturbance, stop the activity and move all individuals and equipment away until the eagles are no longer displaying disturbance behaviors. Contact the Service's Migratory Bird Permit Office to determine how to avoid impacts or if a permit may be needed.																					X	
Migratory Birds	Use care to avoid birds when operating machinery or vehicles near birds.																					X	
	During the project design phase, coordinate with the U.S. Fish and Wildlife Service and the State trust resource agency to site and design projects to avoid or minimize impacts to migratory bird nesting habitats or important feeding/loafing areas.																					X	
	Avoid working in migratory bird nesting habitats during breeding, nesting, and fledging (approximately Mid February to late August). If project activities must occur during this timeframe and breeding, nesting, or fledging birds are present, contact the State trust resource agency to obtain the most recent guidance to protect nesting birds or rookeries and their recommendations will be implemented.																					X	
	Conservation areas may already be marked to protect bird nesting areas. Stay out of existing marked																					X	

Table 6A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources										
				Freshwater Environments		Saltwater Environment Fish Resources											Finfish						
		Upland Geology and Substrates	Nearshore Geology and Substrates	Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment	Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish	Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife
	areas.																						
	If vegetation clearing is necessary, clear vegetation outside of migratory bird nesting season (approximately Mid February to late August) or have a qualified biologist inspect for active nests. If no active nests are found, vegetation may be removed. If active nests are found, vegetation can be removed after the nest successfully fledges.																					X	
	Avoid driving over the wrack line or areas of dense seaweed, as these habitats may contain hatchlings and chicks that are difficult to see.																					X	
	Install pointy, white, piling caps on exposed pilings to prevent bird roosting on piers, docks, and marinas.																					X	
Piping Plover and Red Knot	Provide all individuals working on a project with information in support of general awareness of piping plover or red knot presence and means to avoid birds and their critical or otherwise important habitats.																					X	
	Avoid working in designated critical habitat when piping plover are present (approximately late July through mid-May) or important wintering sites for red knots when they are present(contact U.S. Fish and Wildlife Service for red knot time frames and habitats) to the maximum extent practicable. If work must be conducted when individuals are present, avoid working near concentrations of individuals or post avoidance areas to minimize disturbance.																					X	
	For projects that result in large scale habitat changes, coordinate early with the U.S. Fish and Wildlife Service to enhance or protect habitat features preferred by the species (inlet shoals, lagoons, washover fans, ephemeral pools, baysides and mud flats). Do not remove sand from intertidal, sand, or mud flats. Use dredged material to enhance adjacent emerged and submerged shoals and bayside habitats within and adjacent to project areas.																					X	
	Minimize vegetation planting in preferred habitats and avoid removal of natural organic material ("wrack") year-around along the shoreline.																					X	

Table 6A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources										
				Freshwater Environments		Saltwater Environment Fish Resources											Finfish						
		Upland Geology and Substrates	Nearshore Geology and Substrates	Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment	Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish	Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife
	During recreational use, enforce leash or "no pet" policies in critical or important habitats.																					X	
Red-cockaded woodpecker	Avoid working within active red-cockaded woodpecker clusters (minimum convex polygon containing the aggregation of cavity trees used by a group of red-cockaded woodpeckers and a 200-foot wide buffer surrounding the polygon).																					X	
	If avoidance is not possible or management activities in red-cockaded woodpecker suitable habitat are desired, conduct standard surveys to determine if the habitat is supporting any individuals or presence can be assumed. If red-cockaded woodpeckers are present (or assumed to be), avoid cavity trees and use mechanized equipment during the non-nesting season (approximately April 1 – July 31).																					X	
	If tree removal is necessary, survey pine trees approximately 60 or more years old for active cavities within one year of the proposed removal. Extend surveys from the project site out to no less than ½ mile. Replace any cavities affected by the project via drilled cavity construction.																					X	
	If impacts to suitable foraging habitat (pines approximately 30 or more years old and within ½ mile of an active cavity tree) are proposed, conduct a foraging habitat analysis. Foraging habitat may need to be replanted post-project.																						
	Design projects within red-cockaded woodpecker suitable habitat such that prescribed fire needs are not impeded.																						
MAMMALS																							
Beach Mice	Avoid using vehicles and mechanical equipment within the dune system, including primary, secondary, and tertiary dunes.																						X
	Avoid storing or staging equipment, vehicles, and project debris in a manner or location where it could be colonized by mice.																						X
	If work must occur within the dune system, have a qualified, permitted, biologist survey the project site before work commences and flag potential burrows and tracks so that they can be avoided.																						X

Table 6A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources										
				Freshwater Environments		Saltwater Environment Fish Resources											Finfish						
		Upland Geology and Substrates	Nearshore Geology and Substrates	Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment	Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish	Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife
	Where possible replace footpaths or low-lying dune walkovers with improved walkovers that do not fragment the dune system. For dune walkover construction in Florida and Alabama, *follow the Conservation Measures for Dune Walkover Construction* (USFWS 2013).																						X
	Avoid vegetation removal, including scrub vegetation. If vegetation is damaged or removed during project implementation, plant appropriate native plants in the same location to minimize erosion and provide a food source for beach mice. If forage plants are reduced or limited in the project area, supplemental beach mouse food sources may be necessary.																						X
Manatee	In Florida, follow the most current version of the *Standard Manatee Conditions for In-water Work* available and the *Additional Conditions for Project In-water Activities in Manatee Habitat* (USFWS, 2011).																				X		
	For in-water work in other states (Alabama, Mississippi, Louisiana, and Texas) where manatees could be present, follow conditions b, c, and d of the *Standard Manatee Conditions for In-water Work*. Report any collisions to the U.S. Fish and Wildlife Service or State trust resource agency. Temporary signs, if necessary, can be modified from the Florida Fish and Wildlife Conservation Commission's template to reflect local conditions.																				X		
Bottleneck Dolphin	Follow the most current version of the *Measures for Reducing Entrapment Risk to Protected Species, Revised: May 22, 2012*																				X		
Marine Mammals	Follow the most current version of the *Vessel Strike Avoidance Measures and Reporting for Mariners NOAA Fisheries Service, Southeast Region, Revised February 2008.*																				X		
REPTILES																							
Reticulated Flatwoods Salamander	Avoid suitable habitat during all construction activities and do not permanently alter hydrology of the area. Avoid eliminating connectivity between suitable ponds.																						X
	Use silt fencing to prevent sedimentation or erosion of the project site into ponds.																						X
	If suitable habitat (including the approximately 1,500 buffer zone around breeding ponds) may be																						X

Table 6A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources									
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		Upland Geology and Substrates	Nearshore Geology and Substrates	Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment	Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish	Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife
	impacted, perform pre-project surveys within 2 miles of known breeding sites or assume the presence of reticulated flatwoods salamanders. Schedule work during the non-breeding season (summer) and maintain the natural contour of the ponds.																					
Eastern Indigo Snake	If suitable habitat or other evidence of Eastern indigo snake is discovered within the project area during site surveys, implement the most recent version of the U.S. Fish and Wildlife Service's *Standard Protection Measures for the Eastern Indigo Snake*.																					X
TORTOISES/TURTLES																						
Gopher tortoise	If suitable habitat is present, have a qualified biologist conduct surveys to identify any gopher tortoise burrows. If burrows are within the project area and cannot be avoided through establishing a protective buffer (size determined by U.S. Fish and Wildlife Service and the State trust resource agency), implement standard procedures to relocate the tortoise within the project site but away from the areas of construction or restoration or consider conservation banks. A Candidate Conservation Agreement with Assurances may be appropriate for project sites within the non-listed range of the species.																					X
Sea turtles – in water	Implement the following guidelines: *Sea Turtle and Smalltooth Sawfish Construction Conditions, Revised: March 23, 2006* and *Measures for Reducing Entrapment Risk to Protected Species, Revised: May 22, 2012* and *Vessel Strike Avoidance Measures and Reporting for Mariners NOAA Fisheries Service, Southeast Region, Revised February 2008*.																			X			
Sea turtles – nesting beaches	In Florida and Alabama, avoid the use of vehicles and heavy machinery on nesting beaches during sea turtle nesting and hatching season (Approximately May through October).																			X			
	If work must occur on nesting beaches during sea turtle nesting season (May through August), begin work with vehicles or machinery after 9:00 am local time to allow the sea turtle monitoring program to detect and mark new nests and assess the need to relocate sea turtle nests that could be affected by the project construction. Avoid marked nests by at least 10 feet.																			X			
	If a sea turtle (either adult or hatchling) is observed, maintain at least 200 feet between the turtle																			X			

Table 6A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources										
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	and personnel, equipment, or machinery. Allow the turtle to leave the area of its own volition.																						
	If beach topography is altered, restore all areas to the natural beach profile by 20:00 hours each day during nesting and hatching season. Restore beach topography by raking tire ruts and filling pits or holes.																			X			
	Avoid driving over the wrack line or areas of dense seaweed, as these habitats may contain sea turtle hatchlings that are difficult to see.																			X			
	During nourishment activities, use beach quality sand that is suitable for successful sea turtle nesting and hatchling emergence. Emulate the natural shoreline slope and dune system (including configuration and shape) to the maximum extent practicable.																			X			
FISH																							
Gulf sturgeon	Avoid work in riverine critical habitats when Gulf sturgeon are likely to be present (April to October). Do not dredge in spawning areas when Gulf sturgeon are likely to be present.																		X				
	During project implementation, maintain riparian buffers of at least 100 feet around critical habitat. Install silt fencing to prevent sedimentation or erosion into streams and rivers.																		X				
	Operate dredge equipment in a manner to avoid risks to Gulf sturgeon (e.g., disengage pumps when the cutter head is not in the substrate; avoid pumping water from the bottom of the water column).																		X				
	Implement the Sea Turtle and Smalltooth Construction Conditions, Revised: March 23, 2006 (NOAA, 2006) and *Measures for Reducing Entrapment Risk to Protected Species, Revised: May 22, 2012* as they are protective of Gulf sturgeon as well.																		X				
PLANTS																							
Protected plants	Perform surveys to determine if protected plants (or suitable habitat) are on or adjacent to the project site. Have a qualified individual perform the surveys and follow suitable survey protocols. Conduct plant surveys during appropriate survey periods (usually flowering season).					X		X	X	X	X	X											

Table 6A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources										
				Freshwater Environments		Saltwater Environment Fish Resources											Finfish						
		Upland Geology and Substrates	Nearshore Geology and Substrates	Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment	Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish	Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife
	Design projects to avoid known locations and associated habitat to the extent possible. Use “temporary" removal of plants and soil profile plugs (which include the A and B horizons) with the intent to replace to original location post construction as a last resort. Consider transplanting and seed banking only after all other options are exhausted.					X		X	X	X	X	X											
	Enhance and protect plants on-site and adjacent habitats to the maximum extent possible.					X		X	X	X	X	X											
	Use only native plants for post project restoration efforts.					X		X	X	X	X	X											
Invasive species	Develop and implement a HACCP plan to prevent and control invasive species. Use (ASTM E2590 - 08) or other version of HACCP or other similar planning tool.					X	X	X	X	X	X	X											
	Implement an Integrated Pest Management (IPM) approach to facility design, sanitation, and maintenance to prevent and control invasive and pest species.					X	?	X	X	X	X	X											
	Inspect sites, staging, and buffer areas for common invasive species prior to the onset of work. Map any invasive species detected and note qualitative or quantitative measures regarding abundance. Implement a control plan, if necessary, to ensure these species do not increase in distribution or abundance at a site due to project implementation. Inspect sites periodically to identify and control new colonies/individuals of an invasive species not previously observed prior to construction.					X	X	X	X	X	X	X											
	Prior to bringing any equipment (including personal gear, machinery, vehicles or vessels) to the work site, inspect each item for mud or soil, seeds, and vegetation. If present, clean the equipment, vehicles, or personal gear until they are free from mud, soil, seeds, and vegetation. Inspect the equipment, vehicles, and personal gear each time they are being prepared to go to a site or prior to transferring between sites to avoid spreading exotic, nuisance species.					X	X	X	X	X	X	X											
	Place and maintain predator-proof waste receptacles in strategic locations during project implementation to prevent an increase in predator abundance. For projects designed to enhance or increase visitor use, maintain predator-proof waste receptacles for the life of the project.					X	X	X	X	X	X	X											

Table 6A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources										
				Freshwater Environments		Saltwater Environment Fish Resources											Finfish						
		Upland Geology and Substrates	Nearshore Geology and Substrates	Groundwater	Surface Water	Nearshore Coastal Environment	Offshore Marine Environment	Wetlands	Barrier Islands	Beaches	Submerged Aquatic Vegetation (SAV)	Terrestrial, Coastal, and Riparian Habitat	Nearshore Benthic Communities	Oysters	Pelagic Microfaunal Communities	Sargassum	Demersal Fish	Pelagic Fish	Diadromous and Freshwater Fish	Sea Turtles	Marine Mammals	Birds	Terrestrial Wildlife
	Have the appropriate state agency inspect any equipment or construction materials for invasive species prior to use.					X	X	X	X	X	X	X											
	Inspect and certify propagated or transplanted vegetation as pest and disease free prior to planting in restoration project areas.					X		X	X	X	X	X											
GENERAL CONSTRUCTION MEASURES																							
	Guidelines: - *Construction Guidelines in Florida for Minor Piling-Supported Structures Constructed in or over Submerged Aquatic Vegetation (SAV), Marsh or Mangrove Habitat.* U.S. Army Corps of Engineers/National Marine Fisheries Service August 2001 - *Key for Construction Conditions for Docks or Other Minor Structures Constructed in or Over Johnson's Seagrass (Halophila johnsonii).* National Marine Fisheries Service/U.S. Army Corps of Engineers October 2002 - *National Artificial Reef Plan (as Amended): Guidelines for siting, construction, development, and assessment of artificial reefs*, Revised February 2007 - *Guidelines for Marine Artificial Reef Materials* 1997 GSMFC Number 121 - *Bubble Curtain Specifications for Pile Driving* - *Assessment and Mitigation of Marine Explosives: Guidance for Protected Species in the Southeast U.S.*					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Piling installation	Push pilings into soft, bottom substrate to reduce noise from installation; do not drive and hammer pilings into bottom substrate unless necessary for proper construction.																X	X	X	X	X	X	
Protected species	Provide all individuals working on a project with information in support of general awareness of and means to avoid impacts to protected species and their habitats present at the specific project site.																		X	X	X	X	X
	Survey for other at-risk or imperilled species. If found on site, contact the U.S. Fish and Wildlife Service and State trust resource agency to determine if avoidance or minimization measures or a					X	X	X	X	X	X	X											

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	Candidate Conservation Agreement with Assurances may be appropriate.																					
Site maintenance and conduct	Use the nearest, existing staging, access and egress areas, travel corridors, pathways, and roadways (including those provided by the State, local governments, land managers, trustee, or private property owner, with proper permissions) and do not create new staging areas, access (except dunewalk overs) or egress, or travel corridors through dune habitats.					X	X	X	X	X	X	X								X		X	X
	Limit driving on the beach for construction to the minimum necessary within the designated travel corridor–established just above or just below the primary "wrack" line. Avoid driving on the upper beach whenever possible, and never drive over any dunes or beach vegetation. Check with the U.S. Fish and Wildlife Service and State trust resource agency for additional specific beach driving recommendations in Florida and Alabama.					X			X	X										X		X	X
	Minimize construction noise to the maximum extent practicable when working near protected species and their habitats.																			X	X	X	X
	Maintain or improve all lighting regimes. Methods include: working during daylight hours only, prohibiting lighting on dune walkovers, and using wildlife-friendly lighting where lighting is necessary for human safety.					X			X	X		X								X	X	X	X
	Post signs at kiosks, ramps, and piers to provide visitors with information to avoid and minimize impacts to protected species and their habitats while recreating. Develop signs in coordination with National Marine Fisheries Service, U.S. Fish and Wildlife Service and the local State trust resource agency.					X		X	X	X	X	X							X	X	X	X	X
	Supply and maintain containers for waste fishing gear to avoid fish and wildlife entanglement.																X	X	X	X	X	X	X
Land and vegetation protection	Develop and implement an erosion control plan to minimize erosion during and after construction and where possible: use vegetative buffers (100 feet or greater), revegetate with native species or annual grasses, and conduct work during dry seasons.				X	X		X	X	X	X	X											
	Develop and implement a spill prevention and response plan, including: conducting daily			X	X	X	X	X	X	X	X	X											

Table 6A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources										
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	inspections of all construction and related equipment to assure there are no leaks of antifreeze, hydraulic fluid, or other substances and cleaning and sealing all equipment that would be used in the water to rid it of chemical residue. Develop a contract stipulation to disallow use of any leaking equipment or vehicles.																						
	Prohibit use of hazardous materials, such as: lead paint, creosote, pentachlorophenol, and other wood preservatives during construction in, over, or adjacent to, sensitive sites during construction and routine maintenance.			X	X	X	X	X	X	X	X	X											
	Where landscaping is necessary or desired, use native plants from local sources. If non-native species must be used, ensure they are non-invasive and use them in container plantings.					X		X	X	X		X											
Wetland and aquatic protection	Complete an engineering design and post-construction inspection for projects where geomorphic elevations would be restored in wetlands, marshes, and shallow water habitats to ensure the success of the restoration project. Manage elevation of fill material to ensure projected consolidation rates were accomplished and that habitat suitable for wetland and marsh vegetation is developed.		X			X		X															
	Perform an engineering design and post-construction inspection for projects where geomorphic elevations are restored within wetlands, marshes, and shallow water habitats to ensure the success of the restoration project.		X			X		X															
	Avoid and minimize, to the maximum extent practicable, placement of dredged or fill material in wetlands.							X															
	Design construction equipment corridors to avoid and minimize impacts to wetlands to the maximum extent practicable.							X															
	To the maximum extent possible, implement the placement of sediment to minimize impacts to existing vegetation or burrowing organisms.					X		X					X										
	Place protective warning signs and buoys around at-risk habitats for infrastructure projects that					X					X			X									

Table 6A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

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	could increase recreational uses in SAV or oyster areas.																						
	Apply herbicide in accordance with the direction and guidance provided on the appropriate Environmental Protection Agency (EPA) labels and State statutes during land-based activities.				X	X		X	X	X	X	X											
	Only use suitable borrow sites (that do not contain *Sargassum,* SAV, or oysters) as dredging sites for sediment. Obtain sediments by beneficially using dredged material from navigation channels or by accessing material from approved offshore borrow areas. Sediments must closely match the chemical and physical characteristics of sediment at the restoration site. Additionally, use target borrow areas within reasonable proximity to suitable sites for sediment placement.					X	X	X	X	X		X	X	X		X				X		X	X
	When local conditions indicate the likely presence of contaminated soils and sediments, test soil samples for contaminant levels, and take precautions to avoid disturbance of -or to provide for proper disposal of - contaminated soils and sediments. Evaluate methods prior to dredging to reduce the potential for impacts from turbidity or tarballs.				X	X	X	X	X	X	X	X											
	Perform maintenance of generators, cranes, and any other stationary equipment operated within 150 feet of any natural or wetland area, as necessary, to prevent leaks and spills from entering the water.				X	X		X	X	X		X											
	Designate a vehicle staging area removed from any natural surface water resource or wetland to perform fueling, maintenance, and storage of construction vehicles and equipment. Inspect vehicles and equipment daily prior to leaving the storage area to ensure that no petroleum or oil products are leaking.				X	X		X	X	X													
	Upon completion of construction activities, restore all disturbed areas as necessary to allow habitat functions to return. Create and manage public access developments to enhance recreational experience and educational awareness to minimize effects to habitat within wetland and shallow water areas and to the long-term health of related biological communities.				X	X		X	X	X		X											
	Incorporate containment levees for fill cells for projects using marsh creation or other barrier island restoration. Remove these containment levees after construction to allow for the				X	X		X	X														

Table 6A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources										
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	restoration of nature tidal exchange.																						
	Use silt fencing where appropriate to reduce increased turbidity and siltation in the project vicinity. This would apply to both on land and in water work.				X	X		X	X	X	X	X											
	Continue oyster and clam shell recycling programs to provide natural material for creating additional oyster reefs.					X								X									
	Ensure shells to be introduced for reef creation are subjected to depuration in a secure open air area for a period of not less than 6 months.					X								X									
	Make all efforts to reduce the peak sound level and exposure levels of fish to reduce the potential impact of sound on fish present in the project areas.																X	X	X				
	Implement monitoring of restored oyster beds to evaluate success.					X									X								
	Use a vibratory hammer whenever possible to reduce peak sound pressure levels in the aquatic environment.																X	X	X	X	X		
	Use sound attenuation devices where practicable for pulse-noise (impact hammers) to reduce peak sound pressure levels in the aquatic environment.																X	X	X	X	X		
	Stipulate the timing of activities to avoid impacts to spawning fish and eggs/larvae.																X	X	X				
	Use BMPs to reduce turbidity, such as turbidity blankets, to reduce the potential impact of turbidity on finfish.				X	X	X										X	X	X				
	Screen water withdrawal pipes to minimize potential entrainment of fish from the withdrawal area. Have project proponents coordinate with NMFS to create an intake screen that would minimize potential impingement of fish.																X	X	X				
Aquaculture facilities	Treat effluent from aquaculture facilities to avoid dispersal of potential pathogens into receiving waters.				X	X																	
	Make sure that all aquaculture facilities and fish raised in those facilities meet fish health standards and are screened for pathogens prior to release into receiving waters.																X	X	X	X	X	X	

Table 6A-3: Potential Site, Habitat and Species-Specific Construction Mitigation Measures and BMPs

Category	Potential Mitigation Measures	Geology and Substrates		Hydrology and Water Quality				Habitats					Living Coastal and Marine Resources										
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	Implement a genetics management plan that ensures maintenance of genetic diversity of native stocks of finfish in the Gulf of Mexico.																X	X	X				
	Develop and implement a stocking management plan prior to the release of hatchery-reared finfish.																X	X	X				

Chapter 6 Appendix 6-B: Additional Past, Present, and Reasonably Foreseeable Future Actions

The following tables describe additional actions or programs considered as part of the ERP-PEIS cumulative impact analysis. The tables are organized by the category of actions being evaluated.

Table 6B-1. Example Habitat Conservation and Protection Programs in the Gulf Coast Region

FEDERAL OR FEDERAL/STATE/LOCAL PARTNERSHIP ACTIVITIES	
The National Marine Sanctuaries	• Two sanctuaries are located in the Gulf of Mexico: Flower Garden Banks, which includes 36,000 acres of waters offshore of Texas and Louisiana, and the 2900 square mile area in the Florida Keys.
The National Wildlife Refuge System	• 36 National Wildlife Refuges are located within the coastal areas of the Gulf of Mexico. No new National Wildlife Refuges have been proposed in the Gulf of Mexico proposed planning area.
National Estuarine Research Reserves	• Federal and State partnerships. Past actions have included the establishment of four estuarine research reserves in the Gulf of Mexico area from Texas to Tampa Bay. There are no known future nominated estuaries planned for the National Estuarine Research Reserves in the Gulf of Mexico.
Gulf of Mexico Marine Protected Areas (MPAs) (State and Federal)	• There are approximately 295 MPAs located within the Gulf of Mexico region, covering nearly 40 percent of the Gulf of Mexico U.S. marine waters. MPAs by jurisdiction include 19 in Texas, 17 in Louisiana, 21 in Mississippi, 7 in Alabama, 217 in Florida, and 33 in Federal Waters.
USDA NRCS Wetlands Reserve Program (WRP)	• The WRP is one of the largest private lands wetland restoration and easement programs in the U.S.
USDA Conservation Reserve Program (CRP)	• The CRP is the largest private lands buffer and conservation cover rental contract program in the U.S. Annual enrolled acreage for 2012 (USDA 2012): ○ Texas: 3.3 million acres ○ Louisiana: 325,174 acres ○ Mississippi: 829,056 acres ○ Alabama: 360,489 acres ○ Florida: 51,966 acres
USDA Grassland Reserve Program (GRP)	The GRP is jointly administered by the Farm Service Agency and the Natural Resources Conservation Service to protect and enhance working grazing lands, grasslands and rangelands through rental contracts and conservation easements.
USDA NRCS Farm and Ranch Land Protection Program (FRPP)	The FRPP provides funding to eligible States, Indian tribes, and non-governmental organizations for purchase of conservation easements to protect agricultural use and related conservation values of eligible land by limiting nonagricultural uses of that land.
USDA NRCS Environmental Quality Incentives Program (EQIP)	• EQIP provides financial and technical assistance to farmers and ranchers in order to improve water and air quality, conserve ground and surface water resources, reduce soil erosion and sedimentation, and improve or create wildlife habitat.
USDA NRCS Wildlife Habitat Incentives Program (WHIP)	• WHIP provides financial and technical assistance to wildlife-minded landowners and producers who want to develop and improve wildlife habitat on agricultural land, nonindustrial private forest land, and Indian land.

FEDERAL OR FEDERAL/STATE/LOCAL PARTNERSHIP ACTIVITIES	
The National Park System	• National Park Service lands along the coast or in coastal areas of the Gulf of Mexico include the Everglades National Park, Big Cypress National Preserve, Dry Tortugas National Park, Padre Island National Seashore, Gulf Islands National Seashore, Palo Alto Battlefield National Historical Park, Jean Lafitte National Historic Park, New Orleans Jazz National Historical Park, and DeSoto National Memorial.
NOAA Coastal and Estuarine Land Conservation Program	• The Coastal and Estuarine Land Conservation Program grants to Gulf of Mexico State agencies and local governments to acquire property or conservation easements in the coastal zone or coastal watershed.
USFWS ESA Recovery/Habitat Plans	• As part of the recovery plans for some ESA listed species Critical Habitat has been designated as described in chapter 3. • FWS Habitat Conservation programs including : Endangered Species Grants, Partners for Fish and Wildlife, the Coastal Program; the National Coastal Wetlands Conservation Grant Program; North American Wetlands Conservation Grants, Fish Passage Program; and National Fish Habitat Partnerships.
MSFCA EFH Fishery Management Plans	• EFH has been designated for 55 fish and shellfish species in the Gulf of Mexico. Habitat Areas of Particular Concern (HAPCs) have been defined for some of these designations.
North American Bird Conservation Initiative - Bird Conservation Regions	• The North American Bird Conservation Initiative strategy is to foster coordination and collaboration on key issues of concern, including bird monitoring, conservation design, private lands, international collaboration, and State and Federal agency support for integrated bird conservation. Five NABCI BCRs overlap the area of the northern Gulf of Mexico as described in chapter 3 of this Draft PEIS.

STATE ACTIVITIES	
Texas	• Texas Coastal Management Program; Texas Land and Water Resources Conservation and Recreation Plan; Texas Prairie Wetlands Project; Texas Wetland Conservation Plan; Water for Texas (2012 State Water Plan); Texas 2011 Regional Water Plans; Texas Parks and Wildlife Conservation Programs; Seagrass Conservation Plan for Texas; and the Coastal Erosion Protection Planning and Response Act Program are active coastal and land protection programs.
Louisiana	• Louisiana's 2012 Comprehensive Master Plan for a Sustainable Coast guides all coastal restoration and hurricane protection efforts.
Mississippi	• Coastal Preserves Program works to protect sensitive coastal habitats using Tidelands Trust Funds to acquire coastal areas. The Mississippi Coastal Improvement Program provides resources to address storm damage, saltwater intrusion, erosion, fish and wildlife, and other purposes. Other efforts include: Mississippi Comprehensive Resource Management Plan and Mississippi's Vision for Gulf Coast Recovery, Restoration, and Protection.
Alabama	• Through the Forever Wild Program, and other programs, the Alabama has invested in land protection around the Mobile-Tensaw River delta. Other projects that are likely to be implemented are identified in the Coastal Recovery Commission of Alabama's Roadmap to Resilience
Florida	• Florida Forever program has protected 294,930 acres of functional wetlands, as part of its 9.9 million acres of conservation lands protected.
Private and Non-governmental Conservation Easements—Past to 2010 (Conservation Registry 2012)	
Texas	• Total of 282,060 acres.
Louisiana	• Total of 363,000 acres including holdings of The Nature Conservancy which is one of the largest landowners.
Mississippi	• Total of 294,000 acres including Ducks Unlimited holdings of 289,000 acres.
Alabama	• Total of 71,000 acres including Alabama Land Trust holdings of 23,000 acres.
Florida	• Total of 483,000 acres including Southwest Florida Water Management District holdings of 53,187 acres.

Table 6B-2 below describes many of the Federal, State, and local projects and programs related to habitat restoration that have occurred in the past and present, and are expected to continue into the future. Because of the number of individual restoration projects that are implemented through these programs, major agency or non-governmental programs have been described generically. These many and various types of restoration programs and thousands of projects they compose are implemented at many different scales and in accordance with the various programs, authorities, and bodies that enable restoration activities.

Table 6B-2. Example Restoration Programs in the Gulf Coast Region

FEDERAL ACTIVITIES	
Coastal Impact Assistance Program (CIAP)	• The CIAP provides funding to the six OCS oil- and gas-producing states – Alabama, Alaska, California, Louisiana, Mississippi and Texas – for the conservation, protection and preservation of coastal areas, including wetlands. Each State has an approved plan for implementing appropriations.
The National Estuary Program	• The National Estuary Program provides focused management to benefits habitats, water quality, and other desired resource management objectives for: Coastal Bend Bays and Estuaries, Corpus Christi Bay, Galveston Bay, Barataria-Terrebonne Estuarine Complex, Mobile Bay, Tampa Bay, Sarasota Bay, and Charlotte Harbor.
USDA NRCS Gulf of Mexico Initiative (GOMI)	• NRCS delivers voluntary financial and easement assistance through existing conservation programs in 16 priority watersheds in the Gulf of Mexico watershed. GOMI objectives are to improve water quality, increase water conservation and enhance wildlife habitat within watersheds draining into the Gulf of Mexico through long-term contracts with private landowners would result in implementation of a wide range of conservation practices and land protection easements.
USDA NRCS Migratory Bird Habitat Initiative	• The Migratory Bird Habitat Initiative was established in response to the Deepwater Horizon disaster to provide immediate food and critical habitat for bird populations potentially impacted by the spill.
USDA Farm Bill Conservation Programs (non-easement)	• A number of USDA programs and projects have been implemented in the Gulf of Mexico region to address resource concerns, including wildlife habitat, water quality and quantity, soil quality, and other resource concerns.
USFWS State Wildlife Grants	• USFWS administers several grant programs to support wildlife restoration benefiting Gulf of Mexico ecosystems. USFWS has provided funding to all Gulf states.
Gulf of Mexico Community-Based Restoration Program	• The Gulf of Mexico Community-Based Restoration Program is a multi-year, regional partnership between the Gulf of Mexico Foundation, the NOAA CRP, the EPA Gulf of Mexico Program, and the Gulf States and Caribbean Territories. The purpose of this partnership is to strengthen the conservation efforts of the NOAA CRP and EPA Gulf of Mexico Program by supporting on-the-ground restoration activities and fostering local stewardship of ecologically significant areas.
USACE Programs	• The Water Resource Development Act authorizes USACE to plan and establish wetland areas as part of an authorized water resources development project. The Mississippi Coastal Improvement Program was established by USACE after Hurricane Katrina. The program is comprehensive, consisting of structural, non-structural, and environmental improvement projects for coastal Mississippi. The Northern Gulf of Mexico Regional Sediment Management Plan and Projects addresses restoration and sediment management at a regional scale.
State And Regional Activities	
State and Regional Invasive Species Management Activities	• Invasive species have been the focus of a number of efforts, including: Southeast Aquatic Resource Partnership, Gulf and South Atlantic Regional Panel on Aquatic Invasive Species, Aquatic Nuisance Species Task Force, and National Invasive Species Council.

FEDERAL ACTIVITIES	
Texas	• Oyster restoration efforts in Galveston Bay are underway to address siltation and destruction of oyster beds due to hurricane impacts. Seagrass Conservation Plan for Texas and the Coastal Erosion Protection Planning and Response Act Program are also active coastal restoration/conservation programs. Other restoration priorities and projects being implemented in Texas include: protection and restoration of Chenier Plain wetlands, ICWW shoreline habitat protection and restoration, freshwater inflow and saltwater intrusion initiatives, water quality initiatives in priority watersheds associated with bay ecosystems (e.g., Galveston, San Antonio, Nueces, and Laguna Madre and Aransas Bays, and rookery island protection and restoration efforts.
Louisiana	• Louisiana's 2012 Comprehensive Master Plan for a Sustainable Coast ("Master Plan") represents fundamental state policy with regards to coastal planning and restoration. It was drafted following extensive technical and public input and consultation and includes a suite of restoration and protection measures designed to achieve a sustainable and resilient coastal landscape and to protect Louisiana's coastal resources from inundation. • The Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) and the Louisiana Coastal Wetlands Conservation and Restoration Task Force—a State and Federal partnership—has authorized over 185 projects since its inception representing over 133,000 acres of coastal wetland restoration. A total of 93 projects have been completed, representing 80,000 acres. CWPPRA will implement 91 projects, representing 53,000 acres in the foreseeable future. • LDWF cultch planting ongoing since 1917. Since the initiation of the program, LDWF has placed over 1.5 million cubic yards of cultch material on nearly 30,000 acres. • Other Federal statewide efforts include the Louisiana Coastal Area Near-Term Plan and CPRA's Annual Plans. CPRA's Mississippi River Hydrodynamic and Delta Management Studies authorized through USACE Water Resources Development will address water and sediment management on the Mississippi River. Other restoration actions may be funded through CIAP and/or state surplus dollars.
Mississippi	• Mississippi Coastal Improvement Program provides resources to address storm damage, saltwater intrusion, erosion, fish and wildlife, and other purposes. Fifteen "interim" projects were funded following Hurricane Katrina. Mississippi Coastal Improvement Program has developed a comprehensive program for coastal restoration and protection, especially focused on barrier islands. • In 2009, USACE funded barrier island and other restoration activities. A regional Sediment Management Master Plan is in development to address Gulf barrier island restoration.
Alabama	• State of Alabama is focused on barrier island restoration. Restore Coastal Alabama Project will restore 100 miles of oyster reefs and over 1000 acres of coastal marsh and seagrass beds. Community-based oyster and marsh restoration projects with non-governmental organizations are also underway. Future efforts include the implementation of an Alabama Coastal Resiliency Plan.
Florida	• Florida's Comprehensive Everglades Restoration Plan contributes to Gulf of Mexico restoration efforts. Other programs include Coastal Wildlife Conservation Initiative to address native wildlife and coastal ecosystems and the Statewide Beaches Habitat Conservation Plan led by the Florida Department of Environmental Protection.

FEDERAL ACTIVITIES	
Example Regional Restoration Planning Efforts	
Gulf of Mexico Foundation: Community Based Restoration Partnership	• Gulf of Mexico Foundation has administered the program, managing over 75 restoration projects throughout the Gulf and Caribbean. Example projects include: <u>2012 Community Based Restoration Partnership Projects</u> o Bon Secour Shoreline and Habitat Restoration o Galt Preserve Restoration o Restoring Coral Reefs with in-situ Nursery Techniques <u>2011 Community Based Restoration Partnership Projects</u> o Oyster Reef Restoration in the Texas Coastal Bend o Elmer's Island Community-led Restoration o Habitat Restoration in Mobile Bay o Enhancement of mangrove shorelines in Clam Bayou o Newman Branch Creek Phase II Restoration
NFWF	• NFWF has supported over 450 projects in the Gulf of Mexico with a total value of more than $128 million (NFWF 2012)
The Gulf Coast Joint Venture	• The Gulf Coast Joint Venture is a partnership among Federal and State Agencies, non-profit organizations, and private landowners dedicated to the conservation of priority bird habitat along the U.S. Gulf of Mexico coast. Habitat projects are developed and implemented by 5 regional Initiative Teams of biologists and managers of public and private lands. The Gulf Coast Joint Venture partners include numerous other organizations and hundreds of individuals that are involved in specific collaborative habitat, planning or evaluation projects.

Water Quality Improvement Programs

Table 6B-3 describes many of the Federal, State, and local projects and programs that protect and restore Gulf of Mexico water quality. The programs listed are only representative of efforts being undertaken throughout the Mississippi River and other tributaries to the Gulf of Mexico. In particular, the states outside of the study area but contributing to these waters are implementing programs similar in scope and magnitude to those described below.

Table 6B-3. Example Regulatory and Voluntary Programs to Improve Water Quality in the Gulf Coast Region

USEPA	• Vessel emission control in the Gulf of Mexico - emission standards to reduce the environmental impact from marine spark-ignition engines and vessels by requiring manufacturers to control exhaust emissions from fuel tanks and fuel lines. • Mercury Reduction to Gulf of Mexico - Mercury and Air Toxics Standards for power plants to limit mercury, acid gas, and other pollution from power plants. • Targeting Clean Water section 319 programs in 2015 to regional landscape initiatives, such as the MSR and the Gulf of Mexico, as States develop comprehensive strategies for reducing nitrogen and phosphorus pollution. • Proposed targeted reductions of atmospheric deposition for mercury, sulfur, nitrogen, and other pollutants to U.S. waters, including the Gulf of Mexico. • Under purview of the Clean Water Act, USEPA provide programs to help prevent and control pollutants in our nations waters (i.e. TMDL)
Hypoxia Task Force Action Plan	• Implementation of comprehensive nutrient and phosphorus reduction strategies for States in the Mississippi and Atchafalaya River Basin.
National Ocean Policy Implementation Plan	• National Ocean Council with NOAA, USDA, USGS, and Hypoxia Task Force members propose identification of collaborative measures with regional partnerships to improve water quality in the Gulf of Mexico in 2012; • MSR interagency monitoring, modeling, and assessment partnership to be established in 2013; • With interested States, MSR proposed the collaborative development and implementation of state-wide nitrogen and phosphorus reduction strategies in the MSR and Gulf region in 2014.
USDA NRCS	• The Migratory Bird Habitat Initiative was established in response to the Deepwater Horizon disaster to provide immediate food and critical habitat for bird populations potentially impacted by the spill. • Nutrient Management Implementation--28 million acres of land have come under nutrient management systems within the MSR since 2000, including 4 million acres added in Fiscal Year 2009 and 2010. • Soil Erosion Control--Conservation practices were applied to 34 million acres of land for erosion control from Fiscal 2005 to Fiscal 2010, including 10 million acres in Fiscal 2009 and 2010.
USACE	• Steele Bayou Project-Mississippi - flood control/sediment reduction project in the MSR watershed in which sediment control and water management practices were installed including eight low-head weirs to maintain minimum water depths in the channels and 67 sediment control structures to prevent sediment from filling the channels.
Louisiana-Nutrient Discharge Reductions	• Louisiana Department of Environmental Quality works with industries and municipalities along the Mississippi River to reduce nutrient discharges
Mississippi State Nutrient Reduction Strategy and Delta Farmers	• The Mississippi Department of Environmental Quality participates with the State Nutrient Reduction Strategy Work Group, to develop a consistent approach among MSR States to reduce nutrient loadings to the Gulf. The Mississippi Department of Environmental Quality is co-leading an effort with Delta Farmers Advocating Resource Management to develop a nutrient reduction strategy for the Delta region of Mississippi. • Mississippi/Gulf of Mexico Watershed Nutrient Task Force is working to address statewide nutrient reduction and upper-basin information and technology exchange.

Florida Numerical Nutrient Limits	• Authorized by the Watershed Restoration Act 1999, Florida is implementing nutrient reduction strategies through its total maximum daily load program and setting numerical nutrient limits on the amount of allowable nutrients that can be discharged into State waters.
GOMA, Alabama, Florida, Louisiana, Mississippi, and Texas Nutrient Reduction Strategies	• States and the GOMA to develop and implement State nutrient reduction frameworks to restore local water quality conditions.
Non-Governmental Organizations	• Mississippi River Water Quality Collaborative sponsored by the McKnight Foundation brings together representatives from more than 20 non-governmental organizations from states along the Mississippi River corridor to explore strategies for comprehensive, river-wide water quality improvements. • Lower Mississippi River Conservation Committee, Lower Mississippi River Aquatic Resource Management Plan, a 10-year operational plan to address the primary factors adversely affecting aquatic resources in the river's active floodplain and backwater areas • Ducks Unlimited, • The Conservation Fund, • The Nature Conservancy; • Louisiana Environmental Action Network, • Tennessee Clean Water Network, • Iowa Environmental Council, • Minnesota Center for Environmental Advocacy; • Mississippi River Basin Alliance
International Water Quality Projects	• North American Emissions Control Area-2010 to control marine vessel pollution in international waters.

Other Cumulative Actions

Table 6B-4. Example Military Activities and Projects in the Gulf Coast Region

INSTALLATION	ACTIVITY
Eglin Air Force Base, Pensacola, Florida	• Installation of a fiber optic cable between Eglin and Santa Rosa Island • Three new missions resulting from BRAC 2005 realignment; 59 F-35 Primary Assigned Aircraft and associated cantonment construction and limited flight training operations added under the Record of Decision in 2008 (United States Air Force 2009) • More than 50 planned Military Construction projects beyond FY 2010 with approximately 2 million square feet (Eglin Air Force Base Development Plan)
Hurlburt Field, Eglin Complex, Florida	• Selected as preferred location for future receipt of a 140-person Air Force Reserve MQ-1 Predator squadron that would provide intelligence, surveillance, reconnaissance and precision-strike capability for joint force commanders • More than 50 transportation and capital improvement projects at Hurlburt Field over 2011-2016; $24 million in construction and maintenance projects in FY 2012 (Hurlburt Field 2012)
Naval Air Station Pensacola, Florida	• Potential decrease in Pensacola area jobs of about 3,784 through BRAC 2005 recommendations that realign and consolidate commands; • New training aircraft arrivals through 2020 may require operational and facility changes, including longer runways, new overlays, taxiways, parking aprons and updated operational training space. • Addition of fleet aircraft and missions would intensify the number of flight operations (Escambia County 2003)
BRAC 2005 Recommendations Naval Air Station Corpus Christi, Texas	• Reduction of jobs through realignment and consolidation of commands; general and supporting new construction and facility upgrades required (BRAC 2012)
Naval Air Station Ingleside, Texas	• Base closure under BRAC 2005; main property will revert to Port of Corpus Christi Authority; • Electromagnetic Reduction Facility available for re-use – potential for construction of a marine business park and marina (U.S. Department of the Navy 2010)
Naval Support Area, Panama City, Florida	• The Naval Support Area is expected to continue to expand in the future as the number of classes and students increases with increasing modernization of naval forces, advances in technology and as modern warfare increases research, design, testing and evaluation activities projects. Naval Support Area Panama City uses nine federally designated U.S. Navy Restricted Areas in St. Andrew Bay for near-shore, open water operations along with additional training areas in the Gulf of Mexico. (Bay County 2009).
Operating Training Area	• Military activities that occur within the Gulf of Mexico waters can result in impacts to marine mammals, sea turtles and other marine fauna although the areas restricted to military use may also function as MPAs when not in use. The U.S. Navy has developed range-complex monitoring plans to provide marine mammal and sea turtle monitoring in compliance with the MMPA and the EPA.

Table 6B-5. Example Shipping and Maritime Port Projects the Gulf Coast Region

Texas	
Brownsville	• Lease negotiations with a company based in China to develop a 35-acre site (Port of Brownsville 2012) • Feasibility study on widening and deepening ship channel (USACE 2012; Federal Register 2011)
Galveston	• Cruise ship terminal improvements; proposed lease for 185-acre rail access and bulk cargo terminal on Pelican Island (National Council for Public-Private Partnerships 2012; Seaport Press Review 2012) • Galveston – Upper Galveston Bay – dredged material placement Atkinson Island; beach nourishment Galveston (Brown 2011)
Houston	• Bayport Container and Cruise Terminal full build out expected in 2030; (Port of Houston Authority 2011) • Pelican Island and Houston Ship Channel Disposal Area Management Practices (Brown 2011) • Beneficial Uses Group Project over 50 years would create 4,250 acres of inter-tidal salt marsh in Galveston Bay; create Evia Island for bird nesting habitat and restore Redfish and Goat Islands (Better Bay 2012)
Port Arthur, Beaumont	• Rail yard rehabilitation and construction of a rail spur for intermodal connections (South East Texas Regional Planning Commission 2010)
Port Lavaca-Point Comfort	• Expansion of the turning basin, development of a dry bulk unloading dock and the Calhoun Terminal for liquefied natural gas (LNG) (World PortSource 2012).
Freeport	• $400+ million capital investment plan including phased build out of Velasco Terminal and a future multimodal facility (Port of Freeport Texas 2011)
Texas City	• Phased development of international terminal on 1000 acres to include six berths and 400 acres of container yard. (City of Texas City n.d.)
Corpus Christi	• The Corpus Christi channel improvement project would create nearly 200 acres of shallow-water habitat using dredged material (Port of Corpus Christi 2012).
Maintenance dredging	• Corpus Christi Ship Channel, Freeport Harbor, Houston Ship Channel, Galveston and the Gulf Intracoastal Waterway (USACE 2012; Brown 2011)
Louisiana	
New Orleans	• Expansion and improvements to cruise ship facilities; proposed mixed use redevelopment including maritime and commercial uses; phased expansion of terminal (Port of New Orleans 2012a; Port of New Orleans 2012b; Port of New Orleans 2011; Port of New Orleans 2007) • Relocation of the France Road and Jourdan Road terminals (Port of New Orleans 2012a)
Plaquemines	• Dredged material project to build six bird islands of marsh, shrub/scrub, bare land, and beach habitats that form a chain about 2.5 mi long parallel to the seaward end of the Baptiste Collette Bayou channel. Unconfined dredged material was placed at sub-tidal elevations and was used for restoration of subsided and eroded inter-tidal marsh on the western side of Southwest Pass (Gagliano et al. 2008) • Maintenance dredging Mississippi River outlets at Baptiste Collette Bar • West Pointe a la Hache wetlands project will recreate marsh habitat by harvesting sediment from the Mississippi River (USFWS 2009).
Baton Rouge	• Annual harbor dredging at Mississippi River (USACE 2012)
Lake Charles	• Biennial maintenance dredging of ship channel (USACE 2012)

Port of South Louisiana	• Globalplex Intermodal Terminal redevelopment including 150 acres for expansion (Port of South Louisiana 2011)
Gulf Intracoastal Waterway, Louisiana	• Maintenance dredging (USACE 2012)
Mississippi	
Pascagoula	• New $1.1 billion terminal opened in October 2011; upgrading existing facilities (Port of Pascagoula 2012) • Harbor dredged material management plan is in the final approval stage (Port of Pascagoula 2012); widening of the Pascagoula Bar Channel; Bayou Cassotte Channel widening improvements; Pascagoula and Gulfport harbors dredging (USACE 2012)
Biloxi Harbor	• Dredged material from maintenance of Biloxi Harbor was used to create approximately 30 acres of tidal marsh on the north shore of the east end of the Deer Island (USACE 2011b; Great Lakes Commission 2010)
Alabama	
Perdido Pass	• Maintenance dredging (USACE 2012)
Florida	
Port Manatee	• Incentives for development of 5,000 acres adjacent to the port; planning for intermodal container yard development [Florida Seaport and Transportation and Economic Development Council (FSTEDC) 2011] • Dredging and extension of Berth 12 and extension by 584 ft (USACE 2012)
Port Everglades	• New cruise terminal constructed. Renovation of 4 other cruise terminals part of a 15-yr agreement with Carnival Cruise lines; new 41-acre container terminal; 30-year lease and operating agreement to develop an intermodal container transfer facility (FSTEDC 2011)
Port of Pensacola	• Land available for permanent dredged materials disposal (9 acres) and for future development (8.5 acres)
Port of Tampa	• $100 million improvements including phased expansion of container facilities (two new terminals, expansion of container yard); plans for new product distribution center capacity; upgrading and expanding bulk cargo facilities; expanded cruise service (FSTEDC 2011).
Port of Panama City	• Bulkhead maintenance and rehabilitation; general and bulk cargo area expansions; intermodal distribution center (Port of Panama City 2012) • Deepening of channel and berthing areas (Port of Panama City 2012)
Port of Freeport	• Deepening and widening (USACE 2012).
Maintenance dredging	• Pensacola Harbor Entrance Channel, Port Everglades and Tampa harbors (USACE 2012)
Tampa Bay	• Beneficial use placement in the planning stages for USACE projects, including the creation of wetlands and additional bird nesting habitat just south of Bird Island.

Table 6B-6. Example Tourism and Recreation Programs and Initiatives Within the Gulf Coast Region

INCENTIVE PROGRAMS	
Texas	
Texas Nature Tourism Council	• A council of the Texas Travel Industry Association whose mission is to promote the value of nature tourism in Texas and to educate Texans and visitors about the State's nature tourism resources. The Council also assists and educates businesses, individuals and other entities that provide nature-based tourism services and facilities to the public (Texas Tourism Council 2012).
The Nature Tourism Program of Texas A&M Agrilife Extension	• Provides educational and training programs, materials and consultations for professionals, landowners and the general public to assist people who are interested in nature tourism as a business enterprise, conservation or community development program (Texas A&M University 2012).
Texas Heritage Trail	• The Texas Heritage Trail Program an award-winning heritage tourism initiative that encourages communities, heritage regions, and the State to partner and promote historic and cultural resources. Local preservation efforts, combined with statewide marketing of heritage regions as tourism destinations, increase visitation to cultural and historic sites and is based on 10 scenic driving trails including the Gulf Coast Byway, a portion of the Texas Tropical Trail (Texas Historical Commission 2012).
Houston Wilderness	• Houston Wilderness is a broad-based alliance of business, environmental and government interests that acts in concert to protect, preserve and promote the unique biodiversity of the region's remaining ecological capital from bottomland hardwoods and prairie grasslands to pine forests and wetlands. These eco-region landscapes decrease repetitive flooding, improve water quality, boost outdoor recreation, ecotourism, and economic growth (Houston Wilderness, 2014)
Texas Tourism	• The Office of the Governor, Economic Development and Tourism (Texas Tourism) is responsible for promoting Texas as a premier travel destination. The office works in concert with its partners (convention and visitors bureaus, local chambers of commerce, private travel-related organizations and associations) to promote travel to Texas in both the domestic and international tourism marketing arenas (Texas Office of the Governor, 2014).
Louisiana	
Louisiana Office of Tourism	• Louisiana provides grants and opportunities for partnering for tourism promotion within Louisiana to strengthen marketing opportunities (Louisiana Office of Tourism 2012).

INCENTIVE PROGRAMS	
Mississippi	
Mississippi Tourism Rebate Program	• Program for qualifying new tourism projects that allows a portion of the sales tax paid by visitors to the eligible tourism-oriented enterprise project to reimburse eligible costs incurred during the construction of the project. Qualifying projects include tourism attractions, hotels, public golf courses and marinas and resort developments (Visit Mississippi 2011).
Mississippi-Alabama	
Nature Tourism Initiative	• Tourism initiative for coastal Alabama and Mississippi to evaluate nature-oriented businesses and to provide resources to meet their needs to in order to provide a "quality nature experience for the guests while also encouraging good stewardship and sustainability of the area's natural resources". The Mississippi-Alabama Sea Grant Consortium has developed goals and objects for sustainable development including a goal for developing "healthy coastal economies that include working waterfronts, an abundance of recreation and tourism opportunities, and coastal access for all citizens." (Mississippi-Alabama Sea Grant Consortium 2012)
Florida	
Partnership for Florida's Tourism	• A grassroots coalition designed to raise awareness of the importance of tourism and to increase public funding of tourism marketing. The Partnership is comprised of the Florida Restaurant and Lodging Association, Florida Attractions Association, Florida Association of RV Parks and Campgrounds, Florida Association of Destination Marketing Organizations and VISIT FLORIDA (Partnership for Florida's Tourism 2012).